

REMARKS/ARGUMENTS

Reconsideration of this application is requested. Claims 41 to 67 and 76 to 78 are under active examination.

Amended claims

Claims 45 to 48, 50 and 77 have been amended to reformulate the lists recited therein into proper Markush form.

Information Disclosure Statement

1. Examiner noted that US 5,164,099 was wrongly cited as US 5,164,009 in the IDS filed July 5, 2009. The further IDS filed December 23, 2009 recites the correct document, thereby addressing this issue. The relevant fee to secure consideration of this IDS was paid at that time.

Claim Rejections under 35 USC § 112

2&3. Examiner has rejected claim 50 as being indefinite for failing to use proper Markush form. As stated above, claim 50 has duly been amended to use Markush form. The rejection under this heading should therefore be withdrawn similar adjustments to claims 45-48 and 77 have also been made.

Claim Rejections under 35 USC § 103

4&5. Examiner has rejected claims 41-46, 50-58, 60-67, 76 and 77 as being unpatentable over Harris et al (WO 00/57022) in view of Constien (US 6,394,185).

Examiner acknowledged that Harris et al fails to teach a process wherein a solid polymer capable of being converted by hydrolysis into one or more organic acids is dispersed in a treatment fluid, as required in independent claim 41. However, Examiner argued that it would be obvious to one having ordinary skill in the art to substitute the ester used in Harris et al by a solid polymer taught by Constien. Applicant respectfully disagrees with this assertion.

First, Examiner states that Harris et al discloses a treatment fluid into which is incorporated a solid capable of being converted by hydrolysis into one or more organic acids. With respect, Applicant submits that there is no such clear disclosure in Harris et al. In Harris et al, an ester is used (page 3, lines 5 to 10; claim 1). Not all esters are solids. Rather, many esters are liquids both under normal ambient conditions and under typical well bore conditions. Thus, the teaching of an “ester” in Harris et al is not equivalent to the teaching a “solid ester”.

Moreover, the reference in Harris et al at page 5, lines 29 to 31 to the esters preferably having a “*high flash point*” clearly indicates that the esters contemplated therein are actually liquids. It is emphasised that “*flash point*” is a property of a flammable liquid. For example, the MSDS HyperGlossary (<http://www.ilpi.com/msds/ref/flashpoint.html>) defines this term as

“the lowest temperature at which a liquid can form an ignitable mixture in air near the surface of the liquid” [emphasis added].

There is no concept of a “*flash point*” of a solid. Harris et al therefore does not clearly disclose the use of solids capable of being converted by hydrolysis into one or more inorganic acids. In Harris et al, liquid esters are used that are capable of being converted by hydrolysis into one or more inorganic acids

There is certainly no pointer in Harris et al itself towards using a substance that is (a) solid, (b) a polymer and (c) capable of being converted by hydrolysis into one or more inorganic acids. On the contrary: Harris et al teaches that the specific combination of a liquid ester and a polymer breaker is necessary in order to disrupt a filter cake. It is therefore surprising in view of Harris et al that by adding a solid polymer of the invention to a treatment fluid one can arrive at a process that successfully disrupts a pre-existing filter cake in an underground formation.

Contrary to the assertions made in the Office Action, Constien fails to remedy this deficiency in the teaching of Harris et al. This becomes clear when the following reasons are taken into account.

First, the teaching of Constien relates to a fundamentally different invention than the invention of Harris et al. Harris et al is concerned with introducing treatment fluids into well bores to remove filter cakes. In contrast, Constien teaches solid screen coatings that are intended primarily to protect a well screen during its placement in a formation. Both the purposes and the means of achieving those purposes are therefore very different.

Given these important differences, one of ordinary skill in the art would not simply assume that it would be feasible to replace a liquid ester as used in the treatment fluids of Harris et al with a solid polymer disclosed as being part of a protective screen coating of Constien. Rather, one of ordinary skill in the art would regard the disclosure of solid materials in Constien as being inextricably linked to the actual purpose of the invention taught therein, i.e. protecting a

screen during placement. Clearly, it would not be possible to protect screens using purely liquid materials. Similarly, the choice of liquid esters in Harris et al would be understood as being motivated by the aim of achieving a suitable treatment fluid, rather than simply being an arbitrary choice made from any material capable of releasing an acid. For example, it is stated at page 14 lines 13 to 19 of Harris et al that in at least one embodiment the fluid can penetrate up to several meters into a carbonate formation around a well bore behind a fracture face. Such a degree of penetration would not be possible were the reactive material present as a solid rather than as a liquid.

Accordingly, in view of these important differences between the underlying purposes of the inventions of Harris et al and Constien, one of ordinary skill in the art would regard the documents as being fundamentally incompatible.

Second, even if Harris et al and Constien are considered together, there is still no objective motivation provided in either document that would lead a skilled person to incorporate a solid polymer, such as those taught in Constien, into a treatment fluid as taught in Harris et al.

Harris et al does not disclose or suggest that it would be desirable to replace or otherwise modify the combination of a liquid ester and a polymer breaker that is taught in that document for removing filter cakes. One of ordinary skill in the art is not therefore provided with any incentive to seek to replace the liquid ester with an alternative material for disrupting the filter cake. Certainly, Harris et al does not suggest at all using a material that is a solid polymer rather than a liquid ester. Rather, since the esters of Harris are all non-polymeric liquids, this document actually teaches away from using solid, polymeric acid precursors.

Similarly, Constien does not provide any motivation to select a solid polymer for the specific purpose of removing filter cake when incorporated into a treatment fluid. Constien does envisage that acids can be useful for degrading certain materials in a well bore (especially polysaccharides in drilling or completion fluids, or calcium carbonate in the formation: column 6 lines 45 to 48). However, there is no distinction at all made between liquid and solid acids in relation to this property of the acid. Rather, it is clear from column 6 lines 45 to 57 that to the extent that it is desirable to use a solid acid at all, the underlying reason is that the coating itself must be a solid in order to achieve the essential effect of protecting the screen while it is being placed into the formation. Therefore, choosing a solid acid simply saves on the need to adsorb it

onto a separate support material or encapsulate it into the binder. Accordingly, there is no reason why one of ordinary skill in the art would be motivated to select a solid polymeric acid from Constien when he or she is concerned not with protecting screen materials but with providing fluidic materials for disrupting filter cakes, i.e. methods of the type taught in Harris et al.

This lack of motivation for combining the necessary elements of Harris et al and Constien becomes even more clear when it is taken into account that the protective screen coatings of Constien comprise as essential features not only a reactive material but also a binder. According to Constien, the reactive material is released from the coating when the binder melts. This not only places serious restrictions on appropriate well bore conditions under which the compositions of Constien can be used (i.e., they must have a temperature above the melting point of the binder), but also shows that Constien regarded the combination of reactive material and binder as being essential. This would further dissuade one of ordinary skill in the art from simply selecting a solid polymeric acid in isolation from the other features of Constien and incorporating that into the treatment fluids of Harris.

Third, the process of the present invention has important technical advantages when compared to the process taught in Harris et al, which would not have been obvious from Constien. One such advantage is that, at a given temperature, the rate of acid production obtained from the solid polymers is generally lower than is obtained when esters present in a solution are used. This makes the solid polymers inherently more suitable for acidizing well bores at higher temperatures or for slow-rate acidization of filter cakes at lower temperatures, where a more rapid release of acid could result in faster breakage of filter cake than is required for a particular completion operation. Accordingly, the specific process of the present invention can be desirable under numerous important well bore operations, including those specifically mentioned at page 17, lines 17 to 25 of the present description.

Harris et al does not contemplate this aspect of the present invention at all. In contrast, Harris et al contemplates actually trying to speed up, not slow down, the rate of acid formation compared to that normally obtained from an ester (page 7 lines 4 to 8)

It is therefore submitted that the subject-matter of independent claim 41 would not have been obvious from Harris et al in view of Constien. Furthermore, all of the dependent claims (including claims 42-46, 50-58, 60-67, 76 and 77) depend on claim 41 and therefore derive their

patentability from it. Accordingly, Applicant submits that the subject-matter of these claims must also be non-obvious over Harris et al in view of Constien. It is therefore believed that the rejection over this combination of documents can be withdrawn.

6. The Examiner has rejected claims 47-49 and 76 as being unpatentable over Harris et al in view of Constien as applied to claim 41 above and further in view of Willberg (US 7,265,079).

The discussion in the foregoing paragraphs 4&5 establishes that the claimed subject-matter is non-obvious over Harris et al in view of Constien. Willberg does not remedy the deficiencies in the teaching of Harris et al in view of Constien. In particular, as was explained in detail in Applicant's Amendment dated July 23, 2009 (see in particular paragraph 9) in response to the previous Office Action issued 30 April, 2009, Willberg relates to generation of self-destructing filter cakes and so is fundamentally incompatible with the teaching of Harris relating to exogenous disruption of filter cakes with a treatment fluid. The self-destructing filter cakes of Willberg would not even be suitable for exogenously disrupting filter cakes. Thus, it would not be obvious from Willberg to replace the liquid esters used in the method of Harris et al with a solid polymer capable of producing organic acids by hydrolysis.

Dependent claims 47-49 and 76 depend on claim 41 and therefore derive their patentability from it. Accordingly, Applicant submits that the subject-matter of claims 47-49 and 76 must also be non-obvious over Harris et al in view of Constien and further in view of Willberg. It is therefore believed that the rejection over this combination of documents can be withdrawn.

7. The Examiner has rejected claims 59 and 78 as being unpatentable over Harris et al in view of Constien as applied to claim 41 above and further in view of '698 (WO 01/02698).

The discussion in the foregoing paragraphs 4&5 establishes that the claimed subject-matter is non-obvious over Harris et al in view of Constien. '698 does not remedy the deficiencies in the teaching of Harris et al in view of Constien. In particular, as was explained in detail in Applicant's Amendment dated July 23, 2009 (see in particular paragraph 10) in response to the previous Office Action issued 30 April, 2009, '698 relates to a method for treating an underground reservoir by introducing a treatment liquid comprising a non-polymeric liquid ester and a non-enzyme catalyst. Thus, the fundamental deficiency in Harris et al is shared

by '698: neither document in any way suggests use of a solid polymer capable of producing organic acids when it hydrolyzes. One of ordinary skill in the art would not therefore have arrived at the subject-matter of claim 41 by combining any of Harris et al, Constien and '698.

Dependent claims 59 and 78 depend on claim 41 and therefore derive their patentability from it. Accordingly, Applicant submits that the subject-matter of claims 59 and 78 must also be non-obvious over Harris et al in view of Constien and further in view of '698. It is therefore believed that the rejection over this combination of documents can be withdrawn.

Response to arguments

8-10. Applicant has noted Examiner's remarks on the arguments put forward in response to the previous Office Action. It is gratefully noted that the previous claim objections put forward against claims 41, 54, 55 and 61, the claim rejections under 35 USC 112 of claims 44 and 59 and the claim rejections under 35 USC 102(b) of claims 41-45, 51-58, 60-63 and 66 have all been withdrawn. Applicant's response to the new claim rejections are set out in detail in the foregoing paragraphs 4-7.

Favorable reconsideration and withdrawal of the outstanding objections and rejections is believed to be in order and is respectfully requested.

Respectfully submitted,

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